

# The starfish are dying, and no one knows why

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(Photo: Don Novello)

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Something is killing starfish up and down the West Coast and no one knows what.

A mysterious illness that first appeared in June in Washington state has now spread from Sitka, Alaska, to San Diego. Starfish first waste away and then "turn into goo," divers say. Whatever is causing it can spread with astonishing speed — a healthy group of starfish can die in just 24 hours.

"It's widespread, it's very virulent and it's unlike anything we've seen in the past," said Pete Raimondi, a marine ecologist at the University of California-Santa Cruz who is one of the lead researchers in an international effort to track the outbreak.

The ailment seems to hit starfish the hardest, with smaller numbers of sea urchins and sea cucumbers reported falling to it. No one knows what percentage of the West Coast's starfish are affected but in some areas they've been wiped out.

So far at least 12 different starfish species are known to be at risk, Raimondi said.

Marine biologists call starfish "sea stars" because they are not actually fish, but invertebrates. They've dubbed the ailment "sea star wasting syndrome."

The first case was reported in a tide pool in Washington state's Olympic National Park in June.

Sea stars near Sitka, Alaska, also began to fall ill.

In September sea stars in the waters along the coast of British Columbia in Canada were found affected by the same phenomenon, said Linda Nishida of the Vancouver Aquarium in Vancouver, British Columbia.

The animals first "look a little bit odd," said Mike Murray, director of veterinary services at the Monterey Bay Aquarium in Monterey, Calif. "Their arms may be twisted or weirdly positioned."

They then develop what look like tiny wounds on their surface and bits of whitish discoloration. Within days and sometimes hours, the animal begins to waste away and fall apart. "It's almost like they're melting," he says. "They turn into slime or goo, they just kind of disintegrate."

Scientists are asking recreational divers to report outbreaks. Don Novello is a member of the Kelp Krawlers Dive Club in Olympia Wash. He and a dive partner saw their first infected sea stars on Dec. 21.

"It's like they become zombies of the sea," Novello said. "I saw a leg walking away by itself," he said.

Scientists are scrambling to find the cause. The National Science Foundation gave rapid response research grants over the summer so marine biologists could begin intensively studying the problem. Groups far and wide are involved, including the National Wildlife Center in Madison, Wis., Cornell University in Ithaca, N.Y., and various universities in Canada.

Teams are now going up and down the West Coast looking for outbreaks so they can develop an accurate map of affected areas. The list is ever increasing. "We had our first report in Santa Barbara on Dec. 7," Raimondi said. "Last week, they found five affected areas there."

Researchers believe the sea stars' actual disintegration and death is caused by bacterial infection, but they have no idea what's suddenly making them susceptible.

Raimondi put it this way: "Suppose someone's walking down the street and they get stabbed in the arm and develop an infection and die. So the infection killed them, but the real question is this: Who stabbed them in the first place?"

There have been previous, small scale sea star die-offs. While they looked similar, "there are only certain ways starfish can look when they die. A melting starfish is going to look like a melting starfish," Murray said.

The cause could be a toxins, a virus, bacteria, manmade chemicals, ocean acidification, wastewater discharge or warming oceans. "We're not ruling

anything out," Raimondi said.

The fact that the ailment is so widespread is what's most troubling, said Benjamin Miner, a professor of marine biology at Western Washington University in Bellingham, Wash. "Every time you come up with what seems like a reasonable hypothesis, it's challenged because other affected places don't match."

Whatever is killing the sea stars is highly lethal. "We've had populations go locally extinct overnight. Literally. Some species go from completely fine to a mush ball in 24 hours," said Miner, who's organizing the mapping project.

Starfish may seem fairly unimportant, but they're actually a keystone species in many marine environments. Most live near the shore, but some inhabit the bottom of deep seas. Few things eat them, but they are a top predator, eating mussels, barnacles and sea snails.

"The niche they fill is vital. If they die off, the ecological communities they live in could change fundamentally," Raimondi said.

Sea stars aren't eaten by humans, and there is no danger to people who might come into contact with them, Murray said. However, "melting sea stars, or not, any time you handle wildlife, you want to wash your hands."

Asked for a bright spot, Raimondi could only think of one: "Sea stars don't feel pain," so death by dissolving doesn't hurt them.



A pink sea star (*Pisaster brevispinus*) that has lost two of its arms to sea star wasting syndrome is beginning to dissolve into goo from the center out. (Photo: Don Noviello)

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